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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,513	02/22/2002	Laurent Alain Najman	0142-0380P-SP	6434

2292 7590 04/04/2006

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EXAMINER	
CONOVER, DAMON M	
ART UNIT	**PAPER NUMBER**
2624	

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/079,513	NAJMAN ET AL.	
	Examiner	Art Unit	
	Damon Conover	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11 and 19* is/are allowed.

6)☒ Claim(s) *1-9,12-18 and 20* is/are rejected.

7)☒ Claim(s) *10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed 4 January 2006 has been entered and made of record.

Response to Arguments

2. Applicant's arguments, see line 3, page 10, filed 4 January 2006, with respect to the rejection(s) of claim(s) 1 under 35 U.S.C. § 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shimomura (U.S. Patent 5,091,964).

Ikemure discloses a method and apparatus for recognizing a table in an area of a scanned document (abstract). Ikemure describes that the table is detected by counting the number of black pixels associated with the lateral and longitudinal lines N_{p1}, counting the number of black pixels that are adjacent to each other in the lateral direction N_{p2}, and calculating the ratio. If the ratio is higher than a prescribed value, it is recognized as a table (column 3, lines 28-50). The applicant's argument that the density of lines is not directly related to this ratio is persuasive. Therefore the rejection has been withdrawn.

However, Shimomura discloses an apparatus for extracting a text region from a document image containing texts, drawings, and pictures (column 1, lines 8-12). Shimomura describes that a line density calculation is used for extracting a segmented region from a document image (column 2, lines 26-31).

3. Applicant's arguments, see paragraph 3, page 10, filed 4 January 2006, with respect to the rejection(s) of claim(s) 1 under 35 U.S.C. § 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Werth et al. (U.S. Patent 6,816,630).

In the amended claim, the applicant describes that a plurality of crops of a document where at least one crop corresponds to a corner of the document in a way that neither Ikemure nor Abe reads on it, therefore the rejection based on Ikemure and Abe has been withdrawn.

However, Werth et al. disclose a method of generating a data input form using a computer system (column 1, lines 48-49). Werth describes that registration marks are provided in the four corners of a form to provide locating and identification information for the form to the computer system (column 5, lines 51-56). During processing, the form is read from top to bottom, left to right in order to capture all four corner marks (define a plurality of crops) (column 5, line 65 – column 6, line 2).

4. Applicant's arguments filed 4 January 2006, regarding claim 2, have been fully considered but they are not persuasive.

The applicant argues that applying Ikemure to a technical document would render the operation of Ikemure ineffective. The method for recognizing tables disclosed by Ikemure may be less effective than other methods, but the fact that the prior art structure is capable of performing the intended use means that it meets the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 4, 6, 8, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikemure (U.S. patent 5,502,777), Abe (U.S. patent 5,129,012), and Shimomura in view of Werth et al.

With respect to claim 1, Ikemure discloses a method and apparatus for recognizing a table in an area of a scanned document (abstract). Ikemure describes that the table is detected by counting the number of black pixels associated with the lateral and longitudinal lines N_{p1}, counting the number of black pixels that are adjacent to each other in the lateral direction N_{p2}, and calculating the ratio. If the ratio is higher than a prescribed value, it is recognized as a table (column 3, lines 28-50). Ikemure further discloses an area classifying means for defining rectangular areas (crops) that contain potential tables (column 6, lines 48-59).

Ikemure does not describe a method for determining the location and length of lines greater than a predetermined threshold.

Abe discloses a technique for determining the size and location of a table, block, or line pattern (column 3, lines 2-3). The length of the line is compared to a threshold l_{th} to determine if it could be part of a table (column 3, lines 13-16). If the separation between adjacent lines is less that a predetermined amount δd, the separate lines are

linked to form one line (column 3, lines 19-21). If the two lines are vertically separated by less than a predetermined amount δV, the lines are identified as a single line segment (column 3, lines 24-26).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure, the line detection and merging technique as taught by Abe, in order to improve the accuracy of table detection.

Ikemure describes calculating the ratio of N_{p1} and N_{p2} (column 3, lines 28-50). This ratio may be indicative of line density, but neither Ikemure nor Abe specifically describe a line density calculation.

Shimomura discloses an apparatus for extracting a text region from a document image containing texts, drawings, and pictures (column 1, lines 8-12). Shimomura describes that a line density calculation is used for extracting a segmented region from a document image (column 2, lines 26-31).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure and Abe, the line density calculation as taught by Shimomura, in order to improve apparatus' ability to divide the document image into a plurality of regions (Shimomura, column 1, lines 60-63).

Ikemure discloses an area classifying means for defining rectangular areas (crops) that contain potential tables (column 6, lines 48-59), but neither Ikemure, Abe,

nor Shimomura specifically describe that one of those crops corresponds to a corner of the document.

Werth et al. disclose a method of generating a data input form using a computer system (column 1, lines 48-49). Werth describes that registration marks are provided in the four corners of a form to provide locating and identification information for the form to the computer system (column 5, lines 51-56). During processing, the form is read from top to bottom, left to right in order to capture all four corner marks (define a plurality of crops) (column 5, line 65 – column 6, line 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table registration apparatus of Ikemure, Abe, and Shimomura, the act of scanning the corners of a document as taught by Werth, in order to locate document identification information (Werth, column 5, lines 55-56).

With respect to claims 4 and 8, Abe describes that separate lines are linked to form one line, if the separation between adjacent lines is less than a predetermined amount δd (column 3, lines 19-21) and the line length is above a threshold l_{th} (column 3, lines 13-16).

With respect to claim 6, Ikemure discloses that lateral and longitudinal lines and the corresponding intersection number within a rectangular area are counted in step S8 (column 12, lines 29-38). In step S9, if the intersection number is higher than a prescribed value, it is determined that a table exists within the rectangular area (column 13, lines 8-11).

With respect to claim 14, Ikemure discloses in step S2 that the image resolution is degraded to about 100 dpi to improve the processing rate (column 11, lines 34-41).

With respect to claim 16, the "apparatus for automatically locating a table in a document" corresponds to the "method of automatically locating a table in a document" of claim 1. The discussion is the same as above.

6. Claims 2-3, 5, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikemure, Abe, Shimomura, and Werth as applied to claims 1, 4, 6, 8, 14, and 16 above, and further in view of Syeda-Mahmood ("Extracting Indexing Keywords from Image Structures in Engineering Drawings". ICDAR '99. Proceedings of the Fifth International Conference. Sept. 20-22, 1999. Pages 471 – 474.).

With respect to claim 2, as discussed above, Ikemure discloses a method for defining rectangular areas in a scanned document then comparing the number of black pixels in each area associated with the lateral and longitudinal lines N_{p1} with the number of black pixels in the area that are adjacent to each other in the lateral direction N_{p2} to determine if a table exists. As discussed above, Abe discloses a technique for determining the size and location of a table, block, or line pattern. As discussed above, Shimomura discloses an apparatus for extracting a text region from a document image containing texts, drawings, and pictures (column 1, lines 8-12). As discussed above, Werth et al. disclose a method of generating a data input form using a computer system (column 1, lines 48-49).

The combination of Ikemure, Abe, Shimomura, and Werth does not specify the type of documents that are searched.

Syeda-Mahmood discloses a system for indexing engineering drawings (abstract). Engineering drawings are analogous to technical drawings.

It would have been obvious to one of ordinary skill in the art to include in the table registration apparatus of Ikemure, Abe, Shimomura, and Werth, the indexing of engineering drawings as taught by Syeda-Mahmood, in order to capture descriptive text included in engineering drawings.

With respect to claim 3, as discussed above, Werth et al. disclose a method of generating a data input form using a computer system (column 1, lines 48-49). Werth describes that registration marks are provided in the four corners of a form to provide locating and identification information for the form to the computer system (column 5, lines 51-56). During processing, the form is read from top to bottom, left to right in order to capture all four corner marks (define a plurality of crops) (column 5, line 65 – column 6, line 2).

With respect to claim 5, as discussed above, Abe describes that separate lines are linked to form one line, if the separation between adjacent lines is less than a predetermined amount δd (column 3, lines 19-21) and the line length is above a threshold l_{th} (column 3, lines 13-16).

With respect to claim 17, the "apparatus for automatically locating a table in a document" corresponds to the "method of automatically locating a table in a document" of claim 3. The discussion is the same as above.

7. Claims 7, 9, 13, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikemure, Abe, and Shimomura in view of Tanaka et al. (U.S. Patent 5,548,415).

With respect to claim 7, Ikemure discloses a method and apparatus for recognizing a table in an area of a scanned document (abstract). Ikemure describes that the table is detected by counting the number of black pixels associated with the lateral and longitudinal lines N_{p1}, counting the number of black pixels that are adjacent to each other in the lateral direction N_{p2}, and calculating the ratio. If the ratio is higher than a prescribed value, it is recognized as a table (column 3, lines 28-50). Ikemure further discloses an area classifying means for defining rectangular areas (crops) that contain potential tables (column 6, lines 48-59). Ikemure discloses that lateral and longitudinal lines and the corresponding intersection number within a rectangular area are counted in step S8 (column 12, lines 29-38). In step S9, if the intersection number is higher than a prescribed value, it is determined that a table exists within the rectangular area (column 13, lines 8-11).

Ikemure does not describe a method for determining the location and length of lines greater than a predetermined threshold.

Abe discloses a technique for determining the size and location of a table, block, or line pattern (column 3, lines 2-3). The length of the line is compared to a threshold l_{th} to determine if it could be part of a table (column 3, lines 13-16). If the separation between adjacent lines is less that a predetermined amount δd and the line length is

above a threshold l_{th}, the separate lines are linked to form one line (column 3, lines 19-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure, the line detection and merging technique as taught by Abe, in order to improve the accuracy of table detection.

Ikemure describes calculating the ratio of N_{p1} and N_{p2} (column 3, lines 28-50). This ratio may be indicative of line density, but neither Ikemure nor Abe specifically describe a line density calculation.

Shimomura discloses an apparatus for extracting a text region from a document image containing texts, drawings, and pictures (column 1, lines 8-12). Shimomura describes that a line density calculation is used for extracting a segmented region from a document image (column 2, lines 26-31).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure and Abe, the line density calculation as taught by Shimomura, in order to improve apparatus' ability to divide the document image into a plurality of regions (Shimomura, column 1, lines 60-63).

Neither Ikemure, Abe, nor Shimomura describe evaluating the distance of a group of crops from a border on the document.

Tanaka et al. discloses an image processing apparatus in which an image is captured from an original document to obtain digital image data and the image data is

then subjected to image processing to obtain image data suitable for the type of the apparatus (column 1, lines 6-10). Tanaka et al. describe a distance classifying circuit 11 that calculates the distance between a certain pixel and an edge pixel (border) and classifies the distance (column 10, lines 50-51 and Figure 16).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure, Abe, and Shimomura, the distance-to-the-edge calculation as taught by Tanaka et al., in order to detect the state of a certain pixel (Tanaka et al., column 2, line 36).

With respect to claim 9, Abe describes that separate lines are linked to form one line, if the separation between adjacent lines is less than a predetermined amount δd (column 3, lines 19-21) and the line length is above a threshold l_{th} (column 3, lines 13-16).

With respect to claim 13, Ikemure discloses a method and apparatus for recognizing a table in an area of a scanned document (abstract). Ikemure describes that the table is detected by counting the number of black pixels associated with the lateral and longitudinal lines N_{p1}, counting the number of black pixels that are adjacent to each other in the lateral direction N_{p2}, and calculating the ratio. If the ratio is higher than a prescribed value, it is recognized as a table (column 3, lines 28-50). Ikemure further discloses an area classifying means for defining rectangular areas (crops) that contain potential tables (column 6, lines 48-59). Ikemure also detects the location of a rectangle (frame) circumscribed about the black pixels designating a table or figure using the circumscribed rectangle detecting means (column 4, lines 64-66).

Ikemure does not describe a method for determining the location and length of lines greater than a predetermined threshold.

Abe discloses a technique for determining the size and location of a table, block, or line pattern (column 3, lines 2-3). The length of the line is compared to a threshold l_{th} to determine if it could be part of a table (column 3, lines 13-16). If the separation between adjacent lines is less that a predetermined amount δd and the line length is above a threshold l_{th}, the separate lines are linked to form one line (column 3, lines 19-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure, the line detection and merging technique as taught by Abe, in order to improve the accuracy of table detection.

Ikemure describes calculating the ratio of N_{p1} and N_{p2} (column 3, lines 28-50). This ratio may be indicative of line density, but neither Ikemure nor Abe specifically describe a line density calculation.

Shimomura discloses an apparatus for extracting a text region from a document image containing texts, drawings, and pictures (column 1, lines 8-12). Shimomura describes that a line density calculation is used for extracting a segmented region from a document image (column 2, lines 26-31).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure and Abe, the line density calculation as taught by Shimomura, in order to improve apparatus' ability to

divide the document image into a plurality of regions (Shimomura, column 1, lines 60-63).

Neither Ikemure, Abe, nor Shimomura define a border for the document.

Tanaka et al. discloses an image processing apparatus in which an image is captured from an original document to obtain digital image data and the image data is then subjected to image processing to obtain image data suitable for the type of the apparatus (column 1, lines 6-10). Tanaka et al. describe a distance classifying circuit 11 that calculates the distance between a certain pixel and an edge pixel (border) and classifies the distance. The edge pixels define the border of the document (column 10, lines 50-51 and Figure 16).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure, Abe, and Shimomura, the distance-to-the-edge calculation as taught by Tanaka et al., in order to detect the state of a certain pixel (Tanaka et al., column 2, line 36).

With respect to claim 18, the "apparatus for automatically locating a table in a document" corresponds to the "method of automatically locating a table in a document" of claim 7. The discussion is the same as above.

With respect to claim 20, the "apparatus for automatically locating a table in a document" corresponds to the "method of automatically locating a table in a document" of claim 13. The discussion is the same as above.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikemure, Abe, Shimomura, and Werth as applied to claims 1, 4, 6, 8, 14, and 16 above, and further in view of Takahashi (U.S. patent 6,055,036).

As discussed above, Ikemure discloses a method for defining rectangular areas in a scanned document then comparing the number of black pixels in each area associated with the lateral and longitudinal lines N_{p1} with the number of black pixels in the area that are adjacent to each other in the lateral direction N_{p2} to determine if a table exists. As discussed above, Abe discloses a technique for determining the size and location of a table, block, or line pattern. As discussed above, Shimomura discloses an apparatus for extracting a text region from a document image containing texts, drawings, and pictures (column 1, lines 8-12). As discussed above, Werth et al. disclose a method of generating a data input form using a computer system (column 1, lines 48-49).

The combination of Ikemure, Abe, Shimomura, and Werth does not include a step for verifying the format of the document to be analyzed.

Takahashi discloses an image reading apparatus for reading images from a bound document and printing them in accordance with an image input signal (abstract). The apparatus includes a display panel with a paper key 99-26 to select a desired paper size, a photo key 99-28 to select the kind of documents (text/photo or photo), a light key 99-29, a dark key 99-30, and an auto density key 99-31 (column 5, lines 60-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure, Abe, Shimomura, and

Werth, the display panel as taught by Takahashi in order to customize the scan process based on page size and document type.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikemure, Abe, Shimomura, and Werth as applied to claims 1, 4, 6, 8, 14, and 16 above and further in view of Casey et al. ("Intelligent Forms Processing System". Machine Vision and Applications. Vol. 5. 1992. Pages 143-155).

As discussed above, Ikemure discloses a method for defining rectangular areas in a scanned document then comparing the number of black pixels in each area associated with the lateral and longitudinal lines N_{p1} with the number of black pixels in the area that are adjacent to each other in the lateral direction N_{p2} to determine if a table exists. As discussed above, Abe discloses a technique for determining the size and location of a table, block, or line pattern. As discussed above, Shimomura discloses an apparatus for extracting a text region from a document image containing texts, drawings, and pictures (column 1, lines 8-12). As discussed above, Werth et al. disclose a method of generating a data input form using a computer system (column 1, lines 48-49).

The combination of Ikemure, Abe, Shimomura, and Werth does not include a step for deskewing the scanned image.

Casey et al. disclose a form processing system for indexing form documents and capturing information (abstract). The system includes a method for rotating the fields in the form by the degree of the form skew in order to compensate for the skew (page 147, section 5.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the table recognition apparatus of Ikemure, Abe, Shimomura, and Werth, the skew compensation method as taught by Casey et al. in order to improve the accuracy of the table detection.

Allowable Subject Matter

10. Claims 11 and 19 are allowed.

11. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Allowance

12. The following is an examiner's statement of reasons for allowance:

Independent claim 11 is allowable over the prior art of record. Claim 19 depends from claim 11, therefore is allowed.

Independent claim 11 recites the limitations of: a deciding step that determines whether there is a crop having an evaluated thickness sum that is significantly greater than a corresponding evaluated thickness sum for the other crops in the event that there is no crop having a representative group with the greatest number of lines, and if there is a sum that is significantly greater than a sum for the other crops, designating that crop as the location of the table, or otherwise generating a signal indicative of failure to locate the table.

The closest reference of Ikemure discloses a method and apparatus for recognizing a table in an area of a scanned document (abstract). Ikemure describes that

the table is detected by counting the number of black pixels associated with the lateral and longitudinal lines N_{p1}, counting the number of black pixels that are adjacent to each other in the lateral direction N_{p2}, and calculating the ratio. If the ratio is higher than a prescribed value, it is recognized as a table (column 3, lines 28-50). Ikemure further discloses an area classifying means for defining rectangular areas (crops) that contain potential tables (column 6, lines 48-59). However, Ikemure does not teach the deciding step limitation that details what occurs in the event that no crop is initially identified as including a table.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Cooperman (U.S. Patent 5,784,487) discloses a system for providing information on the structure of a document page so as to complement the textual information provided in an optical character recognition system (column 1, lines 6-9). Cooperman describes that the distance from either the scanned edge or the hard copy document's edge to a region's bounding box is calculated (column 5, lines 65-68).

Bloomberg (U.S. Patent 5,181,255) discloses a method and apparatus for identifying and/or separating machine printed text and handwritten annotations in an image (column 1, lines 26-29). Bloomberg describes the use of line density in the segregation of printed and handwritten text (column 7, lines 58-68).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Damon Conover whose telephone number is (571) 272-5448. The examiner can normally be reached Monday – Friday, 8:00 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso, can be reached at (571) 272-7695. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JOSEPH MANCUSO
SUPERVISORY PATENT EXAMINER